Atty Docket No. 020843-002810US

PTO FAX NO.: 1-571-273-6932

ATTENTION: Examiner Abiy Getachew Group Art Unit 2841

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EXAMINER Abiy Getachew

CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that the following documents in re Application of ROCKY R. ARNOLD et al., Application No. 10/825,999, filed April 15, 2004 for ELECTROMAGNETIC INTERFERENCE SHIELDING FOR A PRINTED CIRCUIT BOARD are being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Documents Attached

1. Amendment after Allowance

Number of pages being transmitted, including this page: 10

Dated: August 14, 2008

Gloria Sikora

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PATENT
Attorney Docket No.: 020843-002810US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No. 9224
ROCKY R. ARNOLD et al.	Examiner: Abiy Getachew
Application No.: 10/825,999	Technology Center/Art Unit: 2841
Filed: April 15, 2004	
For: ELECTROMAGNETIC INTERFERENCE SHIELDING FOR A PRINTED CIRCUIT BOARD	AMENDMENT AFTER ALLOWANCE UNDER 37 CFR § 1.312
Customer No.: 20350	

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 14, 2008

Sir:

In response to the Notice of Allowance of July 16, 2008, please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 9 of this paper.

Amendments to the Specification:

Please replace paragraph [0111] with the following amended paragraph:

[0111] FIG 10A illustrates another shielding solution that is encompassed by the present invention. The shielding solution illustrated in FIG. 10A may be used in addition to the network of vias or as an alternative to the network of vias. As shown in FIG. 10A, a portion of the surface of the printed circuit board beneath and around the electronic component 12 is plated with a conductive material 80, such as aluminum, copper, silver, gold, nickel, tin, or the like. Preferably, the conductive material 80 may be the same material as the ground trace 16. As can be seen, individual lead pads 82 may be positioned on the surface of the printed circuit board 10 and surrounded by a non-conductive surface 84 (such as the surface of the printed circuit board or another insulative material). As such, the lead frame 86 of the electronic component 12 may still contact the lead pads 82 on the printed circuit board 10, and the conductive material 80 will not interfere with the signal path or signal quality. While not shown, conductive material 80 may be in electrical contact with vias or other conductive elements that allow the conductive material to be grounded to a grounded layer.

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (previously presented): A shielded printed circuit board (PCB) comprising:

a PCB comprising a first surface and a second surface;

a metallized polymer shield coupled to the first surface of the PCB;

a grounded layer coupled to the second surface of the PCB;

a plurality of conductive vias that extend from the first surface to the grounded layer so as to electrically couple the metallized polymer shield to the grounded layer;

an electronic component mounted to the first surface of the PCB;

wherein adjacent conductive vias are spaced within the PCB a distance that is small enough to reduce a passage of electromagnetic radiation from the electronic component through the spacing between the adjacent conductive vias;

wherein the metallized polymer shield comprises a shaped polymer substrate that provides a cavity that is sized and shaped to receive the electronic component, wherein the shaped polymer substrate comprises a flange that extends around at least a portion of a perimeter of the cavity in a direction that is substantially parallel to the first surface of the PCB; and

a metal layer disposed over at least one surface of the shaped polymer substrate.

2. (canceled)

3. (previously presented): The shielded PCB of claim 1 wherein the plurality of conductive vias, grounded layer, and metallized polymer shield forms a three dimensional grounded EMI shield that substantially envelopes the electronic component.

4. (original): The shielded PCB of claim 1 wherein the metallized polymer shield is removably coupled to the first surface of the PCB.

5. (original): The shielded PCB of claim 4 wherein the metallized polymer shield is coupled to the vias through a conductive element.

6. (original): The shielded PCB of claim 5 wherein the conductive element comprises a conductive adhesive.

7. (original): The shielded PCB of claim 4 wherein the metallized polymer shield is coupled to the vias through a mechanical connector.

8. (original): The shielded PCB of claim 1 wherein the PCB comprises two or more layers, wherein the second surface is between two adjacent layers of the PCB.

9. (original): The shielded PCB of claim 1 wherein the second surface is an external, bottom surface of the PCB.

10. (original): The shielded PCB of claim 1 wherein the grounded layer comprises a ground plane.

11. (original): The shielded PCB of claim 1 wherein the grounded layer is electrically coupled to a ground plane.

12. (canceled)

13. (currently amended): The shielded PCB of claim [[12]] 1 wherein the flange of the metallized polymer shield comprises a plurality of openings.

14. (original): An electronic device comprising the PCB of claim 1.

15. (currently amended): A printed circuit board comprising:

a multi-layered substrate that comprises a first external surface and a second external surface, wherein a portion of the first external surface is configured to receive an electronic component;

one or more internal grounded layers disposed between adjacent layers of the multi-layered substrate;

a network of conductive elements that extend through at least a portion of the multi-layered substrate, wherein the electrically conductive elements extend from at least one of the internal grounded planes to the first external surface;

a shield coupled to the first surface, the shield electrically coupled to at least some of the conductive elements to provide an electrical grounding connection between the shield and the one or more internal grounded planes;

wherein spaces between adjacent conductive elements comprise a largest dimension that is small enough to substantially reduce emission of electromagnetic radiation from the electronic component;

wherein the shield comprises a shaped polymer substrate that provides a cavity that is sized and shaped to receive an electronic component, wherein the shaped polymer substrate comprises a flange that extends around at least a portion of a perimeter of the cavity in a direction that is substantially parallel to the first external surface of the PCB; and

a metal layer disposed over at least one surface of the shaped polymer substrate.

16. (original): The printed circuit board of claim 15 wherein the network of conductive elements comprises a plurality of conductively coated or filled vias.

17. (original): The printed circuit board of claim 15 further comprising a grounding trace on the first external surface that substantially surrounds the portion of the first external surface that is configured to receive an electronic component.

18. (canceled)

19. (previously presented): The printed circuit board of claim 15 wherein the largest dimension is smaller than half a wavelength of EMI emissions from the electronic component.

20. (original): The printed circuit board of claim 15 wherein the first surface comprises at least one mechanical connector that electrically couples a conductive portion of the shield to the network of conductive elements.

21. (original): The printed circuit board of claim 20 wherein the mechanical connector comprises a conductive or nonconductive adhesive.

22. (original): The printed circuit board of claim 20 wherein the mechanical connector comprises a groove in the first surface, wherein the groove is sized to receive a portion of an EMI shield.

23. (original): The printed circuit board of claim 15 wherein the shield comprises a metal can.

24. (canceled)

25. (original): The printed circuit board of claim 15 wherein the shield is coupled to a ground trace positioned on the first external surface, wherein the ground trace is in electrical communication with at least some of the conductive elements.

26. (original): The printed circuit board of claim 15 wherein the conductive elements make direct contact with a flange of the shield.

27. (original): The printed circuit board of claim 26 wherein a conductive element is disposed on a portion of the conductive elements to create an electrical connection to the shield positioned on the first external surface.

28. (original): The printed circuit board of claim 26 wherein the conductive element comprises conductive adhesive.

29. (original): An electronic device comprising the PCB of claim 15.

30. (previously presented): A method of shielding an electronic component on a printed circuit board (PCB), the method comprising:

providing a PCB that comprises an electronic component on a first surface of the PCB and one or more grounded layers, and a plurality of conductive vias that extend from the first surface to at least one of the grounded layers;

coupling a metallized polymer shield to the first surface of the PCB and around the electronic component to create an electrical connection to the conductive vias and the grounded layer(s),

wherein the electrical connection between the grounded layer(s), vias, and the metallized polymer shield forms a grounded EMI shield that substantially surrounds the electronic component;

wherein adjacent conductive vias are spaced within the PCB a distance that is small enough to reduce a passage of electromagnetic radiation from the electronic component through the spacing between the adjacent conductive vias;

wherein the metallized polymer shield comprises a shaped polymer substrate that provides a cavity that is sized and shaped to receive the electronic component, wherein the shaped polymer substrate comprises a flange that extends around at least a portion of a perimeter of the cavity in a direction that is substantially parallel to the first surface of the PCB; and

a metal layer disposed over at least one surface of the shaped polymer substrate.

31. (original): The method of claim 30 comprising placing the PCB in a housing of an electronic device.

32. (original): The method of claim 30 wherein the metallized polymer shield is removably coupled to the first surface of the PCB.

33. (original): The method of claim 30 wherein the metallized polymer shield is coupled to the conductive vias through a ground trace on the first surface of the PCB.

34. (original): The method of claim 30 comprising positioning a conductive adhesive between the metallized polymer shield and the first surface before the metallized polymer shield is coupled to the first surface of the PCB.

35. (original): The method of claim 30 further comprising creating openings in a flange of the metallized polymer shield that correspond to the position of the vias on the PCB; and

placing a conductive element over the openings to create a conductive path between a metal layer on the metallized polymer shield and the vias.

36. (original): The method of claim 30 wherein providing a PCB comprises forming the vias in the PCB,

wherein the vias are conductively coated or filled and are in a spaced configuration that has a largest distance between an adjacent via that is smaller than half a wavelength of the electromagnetic radiation that is emitted from the electronic component.

37. (original): The method of claim 30 wherein at least one of the grounded layers comprises a ground plane.

38. (original): The method of claim 30 wherein providing a PCB comprises forming a groove in the first surface of the PCB.

39. (previously presented): The shielded PCB of claim 1 wherein at least one of said conductive vias is located below said PCB.

40. (previously presented): The printed circuit board of claim 15 wherein at least one of said conductive elements is located below said electronic component.

41. (previously presented): The method of claim 30 wherein said providing a PCB further comprises providing at least one of said plurality of conductive vias to be located below said PCB.

REMARKS/ARGUMENTS

This amendment is submitted in response to a telephone call made by the Examiner to the undersigned on August 14, 2008.

Claims 1, 3-11, 13-17, 19-23, and 25-41 remain allowed in this application. Claims 2, 12, 18 and 24 were canceled.

In the telephone call the Examiner pointed out that claim 13 depended from canceled claim 12 and requested that the appropriate correction be made. The Examiner also pointed out that paragraph [0111] on page 20 contained a line with missing information and requested that the missing information be entered. In response, the Applicant has amended claim 13 to depend from claim 1 and has amended paragraph [0111] to include the missing information.

CONCLUSION

Entry of this amendment is respectfully urged since it merely cures a formal defect in one of the claims and does not touch the merits. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

Jesus Del Castillo
Reg. No. 51,604

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400
Fax: 415-576-0300
JDC:gjs
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